

MODERNISING LENIN'S RUSSIA

Economic Reconstruction,
Foreign Trade and the Railways

ANTHONY HEYWOOD



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1 Prologue

Much of the explanation for the railway imports policy of 1920–4 must be sought in the Bolshevik leadership's economic strategy and assessment of the international situation in the winter of 1919–20. But the policy also had roots in the epoch prior to the October Revolution. The Bolshevik government was well aware that railway development had been among the most important driving forces of pre-war industrialisation between the 1860s and 1914, not least through the tsarist regime's policy of industrial protectionism. At the same time, the Bolsheviks knew that the foreign sector had always been important for the Russian railways, especially as a source of investment funds in the pre-war era and as a supplier of urgently needed equipment during the First World War. An overview of these issues will help to clarify the extent to which Bolshevik policy was shaped by precedents from the pre-Soviet period.

The pre-1914 context

The state-led industrialisation of Russia from the 1860s onwards was intended to create a modern, self-sufficient industrial economy quickly. It reflected not only the tsarist state's traditional preoccupation with overcoming Russia's economic backwardness relative to the West but also a growing realisation that, to quote Marks, 'the road to power for nation-states in the nineteenth and twentieth centuries lay along the path of technological advance'.¹ The shocking defeat on home territory in the Crimean War of 1853–6 and the humiliating terms of the subsequent Treaty of Paris marginalised the position of Russia in Europe and called into question her status as a great power. National pride was damaged, as was the prestige of the regime itself both at home and abroad. Increasingly, state officials understood that only by modernising the country's economy and military forces could

the regime hope to restore its reputation, guarantee its future and resume an active role in European affairs.

Formidable problems were inherent in this process of modernisation. The country's vast size hindered rapid communications and stretched the available resources. Other significant geographical obstacles included harsh climatic conditions, a lack of east-west waterways and poor accessibility of natural resources. The abolition of serfdom was among the most important prerequisites for industrial modernisation, yet this presented a complex social, political and economic challenge in itself. In the economic arena, a chronic shortage of domestic investment capital raised the thorny question of whether foreign capital could be used on a large scale without prejudicing the country's political and economic interests. Furthermore, radical economic and social changes might themselves cause revolution. If economic modernisation was the key to the regime's long-term future, it was potentially also the means of its early destruction.

The tsarist state was thus faced with making unpopular compromises between stabilising its own authority and promoting potentially destabilising industrial modernisation. The Emancipation Act of 1861 abolished serfdom on terms which attempted to satisfy the incompatible interests of landowners and peasants but which broadly failed to satisfy either. The subsequent drive to expand the industrial economy prompted two particularly important and difficult compromises. One was the acceptance of heavy short- and medium-term reliance on foreign capital and imports, a tactic which provoked persistent nationalist ire. The other was the prioritisation of industrial development over the balanced development of the industrial and agrarian sectors, at the cost of continuing rural backwardness, low agricultural productivity and vulnerability to famine. This was especially so during the forced industrialisation drive of the 1890s masterminded by the Minister of Finances, Count S. Iu. Vitte, who was accused of causing famine and selling Russia to foreign capitalists.²

Nationalist indignation notwithstanding, the foreign sector became vital for Russia's economic modernisation, with investment capital coming mostly from Western Europe.³ Germany emerged as the main supplier in the 1870s whilst Bismarck promoted the Dreikaiserbund, but French capital predominated from the 1890s until 1914 as a key component of the Franco-Russian alliance. Much of this investment went into commercial enterprises or government securities and railway loans. Thus, in 1913 total foreign capital investment was some 8,445 million rubles, of which 3,971 million rubles were in state loans,

975 million in state-backed railway loans and 2,602 million in joint-stock companies.⁴ In fact, Russia became Europe's largest debtor with a national debt of 8,811 million rubles in 1914, of which the foreign share was some 48 per cent.⁵ Moreover, once account was taken of the returns on foreign direct investment and interest payments on loans, a large balance of payments deficit necessitated further government borrowing abroad.⁶

The value of the external trade turnover grew dramatically in absolute terms, especially after 1890. Averaging 554 million credit rubles between 1866 and 1870, it climbed to an average of 1,079 million in 1891–5 and 2,641 million by 1909–13. The average balance of trade was unfavourable in the decade 1866–75, but careful management helped to ensure that surpluses were usually recorded thereafter, their size varying with the harvest and resultant export earnings. The generally positive balance and the accumulation of large gold reserves facilitated currency stability and the eventual move to the gold standard in 1897, and these conditions also helped to attract foreign investment from the 1880s onwards.⁷

Export earnings came mostly from agricultural products, semi-manufactured goods and such raw materials as timber, flax and oil. As for imports, machinery and other manufactured goods accounted for between a quarter and a third of the total value, whereas raw materials and semimanufactured goods such as cotton, metals and coal amounted to approximately one half. (See table 1.1.) Within these broad categories, however, were some significant changes over time due to tariff increases and import substitution, and, as will be seen below, this was particularly important with regard to railway supplies. Among the trade partners Germany became pre-eminent: in 1913 she supplied some 52.6 per cent of total imports by value, especially machinery, chemicals and new technology, and purchased nearly 32 per cent of exports, particularly grain. By comparison, second-placed Britain accounted for only about 13.9 per cent of Russian imports and 18.8 per cent of exports.⁸

Domestic industrial development encompassed heavy engineering and metallurgical plants, chemicals, mining and oil extraction as well as light industries such as textiles and food processing. It led, in particular, to the eclipse of the Urals by the Donets Basin (Donbass) as the empire's centre of heavy industry on the basis of its rich iron ore and coal deposits, whilst the Caucasus became the world's leading oil producer by the turn of the century. But railway development dominated the initial stages of this modernisation process, and it

Table 1.1. *Profile of Russian foreign trade, 1894–1913 (percentages of total exports/imports)*

Year	Foodstuffs		Raw materials and semimanufactured goods		Animals		Manufactured goods	
	Export	Import	Export	Import	Export	Import	Export	Import
1894	56.9	18.4	37.5	54.4	2.0	0.7	3.6	26.5
1898	52.5	16.6	40.3	48.3	2.4	0.6	4.8	34.5
1903	61.3	20.1	31.9	52.5	2.0	0.8	4.8	26.6
1908	54.4	23.2	37.8	47.6	2.5	0.8	5.3	28.4
1913	55.3	17.3	36.9	48.6	2.2	1.3	5.6	32.8

Source: C. White, *British and American Commercial Relations*, p. 6.

remained among the driving forces of economic expansion in 1914. To cite Westwood: 'Tsarist economic policy placed railway development in the forefront, as both end and means.'⁹

Russia's railway age had begun in the late 1830s. It immediately raised the issue of tension between technological progress and political stability, some government ministers fearing that railways might encourage political unrest by allowing the population much greater freedom of movement. But the Tsar, Nicholas I, had witnessed railway operation in England and sensed that it might have important economic, political and strategic benefits for the empire.¹⁰ He sanctioned the building of a short experimental line between St Petersburg and Tsarskoe Selo, and the successful opening of this venture in 1837 laid most doubts to rest, besides confirming the technical practicability of railway operation in Russian conditions. Opponents persisted, but the fact that only two main lines were built by the mid-1850s was due mainly to a chronic shortage of domestic finance and the government's reluctance to borrow heavily abroad. However, the difficulty of supplying Russia's army during the Crimean War produced the necessary impetus for prioritising railway construction and overcoming this financial barrier, and as early as 2 September 1854 an instruction was issued to begin surveying a Moscow-Khar'kov-Odessa route.¹¹

Western perceptions of pre-war tsarist railways have tended towards the exotic, especially the epic construction of the trans-Siberian railway and the choice of a track gauge of 1,524 mm instead of the European standard of 1,435 mm.¹² In fact, after the uncertain start, the basic pattern of railway development was relatively mundane.

The authorities concentrated on creating a national network of so-called common-carrier railways – routes belonging to private or state-owned railway companies which were in turn supervised by the Ministry of Ways of Communication (MPS) and legally obliged as a public service to carry all traffic offered, as opposed to the non-public so-called feeder railways usually built and operated by industrial enterprises. Thanks to government encouragement, including financial incentives for private investors, a construction boom ensued in the 1860s and 1870s. Mainly funded by foreign capital, this effort delivered a core common-carrier network of some 20,000 km which radiated from Moscow to the iron ore deposits of the Urals, the coal, ores and new heavy industry of the Donbass, the grain of the Volga region and Ukraine, and the Baltic and Black Sea ports. As in the economy at large, the 1880s were a decade of consolidation for the railways, though a number of strategically important lines were completed in the extreme west, the Caucasus and Central Asia. In the 1890s the 'Vitte system' of rapid industrialisation produced a second railway boom, which was mostly state-funded, and by 1903 the common-carrier network extended to 58,400 km. After a short lull, further construction took the total to some 70,500 km by 1913, including the completion of the trans-Siberian route and more lines in Central Asia.¹³ Correspondingly, the number of railway staff rose from about 32,000 in 1865 to some 815,500 in 1913, and the locomotive stock grew from a mere 401 in 1860 to 20,057 in 1913.¹⁴ Freight traffic virtually doubled during every decade except the 1880s, reaching 76.8 thousand million tonne-km in 1913, and 29.3 thousand million passenger-km were recorded in 1913, equating to 244 million journeys.¹⁵

Railway construction was expected to drive Russia's economic modernisation in three main ways. Its primary function was to improve transport facilities for economic, political and military purposes. The iron horse promised to overcome or reduce the major geographical problems of vast distances, difficult climate, poor accessibility of natural resources and lack of suitable waterways. New markets might be developed at home and abroad, and whole regions such as Eastern Siberia and parts of Central Asia could be opened for settlement and economic development. Many railways in border regions and elsewhere were planned mainly for military shipments, whilst others were devised to support imperial expansion and colonisation.

Secondly, railway construction required a very significant share of the available resources. Though investment trends were similar to

those in other sectors, the amount was generally much larger.¹⁶ Indeed the first railway boom dominated the opening phase of industrialisation: in 1861–73 investment in 53 railway companies represented 65 per cent of total investment in new joint-stock companies, mainly from private sources.¹⁷ When the state subsequently became the main investor, its investment in new railways and track improvements totalled some 3,588 million rubles (at contemporary prices) between 1895 and 1914, the annual figure peaking at 358 million in 1902 and never falling below the 109 million of 1895. As Gatrell remarks, railway investment (excluding transport equipment) represented as much as 25 per cent of total net investment in 1896–1900 and possibly more than 30 per cent if equipment is included.¹⁸

Thirdly, there was the question of potential ‘backward linkages’ to Russian industry. The construction and operation of railways generated an enormous direct and indirect need for almost every conceivable metal and textile product, as well as coal, timber, lubricating oils and other chemical products. Government officials realised very quickly that railway development could be used to spur the growth of other industries, expanding existing communities and creating new ones. The question of exploiting this potential arose as early as the 1840s, and after several decades of dependence on foreign suppliers, protectionism became a cornerstone of government policy concerning railway procurement from the late 1860s until 1914.

The foreign sector always occupied a controversial place in tsarist railway development, though its roles varied over time. It was an Austrian engineer, Franz Anton von Gerstner, who promoted the Tsarskoe Selo Railway, and foreign capital would remain essential for the railway sector for the remainder of the tsarist period in the absence of sufficient Russian state or private capital. During the Crimean War, having prioritised the creation of a railway network, the Tsar even used third parties to inform British financiers that their capital would be welcome for postwar railway development.¹⁹ Foreign finance duly became the key to the boom of the 1860s. However, financial scandals were soon such a serious economic and political problem that the government changed course towards state intervention in the late 1860s, and for several decades state borrowing abroad became the primary means of raising the necessary capital for the railways. Later, after 1905, foreign private capital reacquired some importance when the government began to encourage private sector investment again.

The foreign loans were used for two main purposes. One was the construction of railways, especially a small number of top-priority routes during the 1880s and then the boom of the 1890s. The other was the purchase of existing, often impoverished, private railway companies in order to establish state control over railway finances, procurement policy and traffic operations.²⁰ By 1890 some 29 per cent of the network was state-owned and managed by the MPS, this figure rising to 70 per cent by 1900 thanks to further purchases and government-sponsored construction. Concurrently, the remaining private railways were gradually amalgamated into a small number of large companies and subjected to close control by the MPS, an arrangement which endured until 1918.²¹

Imports, too, were essential for constructing early railways. However, the government began promoting import substitution in the 1840s when it required the American contractors for the proposed Petersburg–Moscow line to use Russian materials and equipment wherever possible and to adapt the Aleksandrov iron foundry in St Petersburg to produce rolling-stock.²² Two decades later the need for speed meant that the boom of the 1860s was deliberately fuelled by concessions on imports tariffs for iron, rails and other railway equipment, but a conscious policy of using railway development to stimulate domestic industrial growth emerged by the end of that decade, and this remained in place until 1914. The initial measures included the reinstatement and raising of customs tariffs, and a requirement for railway lessees to purchase a proportion of their equipment in Russia.²³

But this protectionist policy had its problems. Russian engineering companies were nonetheless slow to appear and expand. Although four locomotive-building firms materialised in 1869–70, they refused to increase production significantly until the state raised customs tariffs and provided generous subsidies with a guarantee of sales. To complicate matters further, some private railways stubbornly insisted that imported locomotives were cheaper, and, when forced by the government to back down, they rebelliously announced a surplus of stock and placed their state-imposed engines in store.²⁴ Not until the 1880s, with the help of high tariffs, did domestic suppliers of railway equipment at last corner the market. Thus, locally produced rails met about 99 per cent of requirements by the 1890s.²⁵ Similarly, another five factories opened between 1892 and 1900 to cover the increasing demand for locomotives.²⁶ As a result, the net expansion of 9,427 locomotives on the network in 1893–1904 included only 1,077

imports, or some 12 per cent of the growth. The majority of these foreign engines were German, which reflected Germany's emergence as the principal trading partner; the USA was also prominent, whereas British deliveries were almost non-existent after 1880.²⁷

Import substitution helped to ensure that the relationship between the engineering factories and the railways remained tense, especially once recession struck in 1900 and the state had to reduce its orders for railway equipment by as much as 10 per cent.²⁸ The government's response to the recession was well intentioned but had costly long-term side effects which would persist into the Soviet period. The engineering companies were permitted to regroup into powerful cartels, and a so-called Committee for Railway Orders was created under the MPS to channel state orders for rails and rolling-stock to Russian firms at high prices for the duration of the crisis; rails, for example, were bought from eight factories at the peak-demand prices of 1899.²⁹ This arrangement certainly protected jobs and plant, but its retention until 1915 at the factories' insistence meant that the exchequer and the private railways were faced with long-term high prices which, moreover, encouraged the factories to underproduce rather than diversify into alternatives.³⁰ The few remaining private railway companies also complained bitterly of their inability to influence design and technical decisions, and of overcharging, late delivery and poor quality. In 1913 they even petitioned the government for the right to choose their suppliers, to import equipment at will, to build engines and rolling-stock themselves and to own fuel deposits; but their plea was refused.³¹

By the outbreak of the First World War the overall results of tsarist industrialisation were famously and perhaps fatally mixed.³² On the one hand, there was evidence of substantial progress. A railway system now connected the major cities of the empire, including the trans-Siberian route to Vladivostok. Many modern industries were well established – iron, steel, mining, heavy engineering and light industries such as textiles and food processing – with a tendency towards large well-equipped plants. Unsurprisingly, absolute levels of industrial output had grown substantially. For instance, average annual coal production increased from about 355,500 tonnes in the early 1860s to some 29,995,000 tonnes just before the First World War. The annual output of pig-iron rose from about 295,000 tonnes to approximately 3,848,500 tonnes over the same period. Overall, it has been estimated that Russian industrial output in manufacturing and mining grew on average by as much as 5 per cent per annum between 1888 and 1913.³³

On the other hand there were also serious shortcomings on the eve of the war. Many areas of engineering and chemical production were still underdeveloped, especially high technology, and the agrarian sector remained weak despite its importance for export earnings. Industrial investment was concentrated in the St Petersburg and Moscow regions, the extreme west and the Donbass, and most railway activity was likewise in European Russia. The average annual increase in total real output per capita between 1860 and 1913 remained low at perhaps only 1 per cent because agricultural output – the largest sector – grew very slowly. Indeed, Russia's high rates of industrial growth partly reflected the fact that her industrialisation began from a much smaller base in the 1860s than was already enjoyed by her major foreign rivals, who themselves achieved much further progress during this period. It has even been argued that Russia lost ground: placed ninth/tenth jointly with Italy in a ranking of industrial progress of world powers in the 1860s, she was tenth behind Italy in 1910. Similarly, whereas Russian national income per capita, measured at 1913 prices, grew from 71 to 119 rubles between 1861 and 1913, the national incomes of the other major powers all grew at faster rates, including a spectacular increase from 450 to 1,033 rubles per head in the United States.³⁴

The state of the railways was a particular concern. The key issues, which were to have an important bearing on early Soviet policy and which have excited perhaps the liveliest controversy, were the railway system's financial health, physical condition and adequacy. At the time the railways had few defenders: the government was concerned about excessive costs and debts, the public objected to delays and high prices, and harassed railway officials were happy to highlight obsolescence so as to justify new equipment. Subsequent analyses by Soviet officials and historians, shaped by both Russian Marxism and the railways' wartime crisis and collapse in 1915–20, usually concluded that the system was underdeveloped and offered a poor service, for which profit-led penny-pinching was to blame, and this view has been widely accepted in the West.³⁵ Russia, it has been argued, had far less track per person and per square kilometre than her international competitors, and ports such as Murmansk, Archangel and Vladivostok were poorly connected to the main network. Also, the accident rate was worsening in the years immediately preceding the First World War. There were frequent shortages of wagons, and the number of locomotives relative to traffic was decreasing. Typical of the neglect, in this view, was the fact that

locomotive production by Russian factories declined to just 313 engines in 1912 compared to a possible output of more than 1,200.³⁶

However, a contrasting positive assessment of the situation has also been advanced.³⁷ By again encouraging private investment in railway construction after a break of over thirty years, the state was able to concentrate on measures to improve productivity. Detailed planning of principal freight shipments was introduced, attempts were made to eradicate poor management, and existing lines were upgraded, especially by adding second tracks and by strengthening bridges and laying stronger rails for heavier trains.³⁸ This policy can be seen as a sensible compromise that helped to relieve bottle-necks, and in any case lines to the secondary ports were generally being built or improved. Furthermore, the comparisons of track mileage against population and area have been misleading through their inclusion of vast tracts of uninhabited wasteland. Also, greater efficiency in the use of equipment may explain the apparent shortfalls of stock and high rates of track utilisation, and greater efficiency may also explain why traffic and income were rising rapidly whilst operating expenses were decreasing. As for locomotives, the introduction of higher-powered types logically enabled the withdrawal of a much larger number of old, weaker engines. Fewer engines would be needed because better productivity was expected from the latest, most powerful designs, notably two classes which, with modifications, were built for four decades under tsarist and Soviet rule. One was the Class E freight locomotive with a 0–10–0 wheel arrangement (that is, with ten coupled ‘driving’ wheels but no other non-powered supporting wheels at either end), which appeared in 1911; the other was the Class S 2–6–2 passenger engine of 1910.³⁹

Immediate difficulties notwithstanding, the MPS expected a bright future for the railways. Some 13,000 km of new routes were under construction, and many more lines were considered essential. Also, the ministry expected traffic to increase rapidly during the second half of the decade, and it was drafting plans for a big expansion of the locomotive stock, including a new phase of modernisation, to cope with this growth and defence needs. Its Commission for Rolling-stock and Traction wanted state orders for some 390 Class Shch 2–8–0 engines (a medium-powered freight design of 1907) and up to 100 Class S passenger engines in 1915, followed by up to 1,000 new ‘powerful’ engines in 1916 and a further 1,000 each year thereafter until 1920.⁴⁰ Here, however, the commission encountered a technical issue which would resurface in 1919–20: whether to continue with the

latest 'powerful' freight type (the Class E 0-10-0) or introduce larger and more modern but more expensive engines for even heavier trains. Typically, the commission favoured a new type but could not agree on a design. Some engineers, including Professor Lomonosov, advocated a 0-10-2 arrangement as the extra rear axle would allow a larger firebox and more efficient burning of fuel. But the Chairman, Professor N. L. Shchukin, and others preferred a 2-10-0 as it could have a larger boiler, give a smoother ride, would yield higher speeds and cause less wear to the track.⁴¹

On the eve of the war, then, the railways remained vitally important for the economy, defence and the tsarist regime's political control. Almost certainly, as the example of the locomotive-builders implies, the 'backward linkages' between railway development and industrial growth were becoming much less straightforward than has often been assumed.⁴² But the railway system was one of the country's largest employers, and it was still the only form of fast year-round long-distance transport. It was the key to successful military mobilisation. A large amount of construction work was in progress, and much more capacity was wanted, not least for defence purposes. In short, the railways remained central to government and popular thinking about the future. To judge by the MPS's traffic predictions, they may even have been set for a new 'boom'.

Not only were the railways important to the state, but foreign capital remained vital for railway construction. Private investment, whether domestic or foreign, continued to be seen as politically undesirable but was now reaccepted as indispensable. With regard to procurement policy, the tradition of fairly strict protectionism prevailed. Unfortunately, it still soured relations between the engineering industry and the railways, imports naturally gaining the allure of the unattainable for the latter. Significantly, this chronic tension would endure into the Soviet era.

Wartime imports

Russia's declaration of war against the Central Powers in 1914 evinced a wave of popular patriotic fervour. State officials, generals, politicians and populace expected a short and victorious campaign. But the mood soon changed. Nobody was prepared for the long trench-based struggle which ensued. Problems in the war economy soon assumed crisis proportions. Shortages of armaments loomed as early as the autumn of 1914, yet the government failed to organise an

effective response, and a supply crisis developed during the winter of 1914–15. Morale was shaken by the army's retreat from Poland in 1915, and the troops and public became increasingly restive. Ultimately, amidst military stalemate and chronic food shortages, the tsarist regime fell in the revolution of February 1917 and was replaced by the Provisional government.⁴³

Like the country as a whole, the railway and foreign trade sectors faced unprecedented challenges. Demand for their services increased rapidly, and both sectors faced a difficult struggle to comply. Desperate times required desperate measures, and one was to abandon protectionism concerning railway supplies. Large state railway orders were placed abroad, mainly with North American companies. By February 1917 the MPS had ordered nearly 1,000 new locomotives, 20,000 wagons and several hundred thousand tonnes of rails, spare parts and other equipment. Thereafter the Provisional government sought a further 2,000 engines and 40,000 wagons as well as rails and workshop equipment. This major change in railway procurement policy would represent an important precedent for Soviet officials in 1920, and the remainder of this chapter provides an introductory overview of the main events pending further research.

The railways were inevitably at the heart of the war effort.⁴⁴ The short-term demands of mobilisation apart, they had to cope with rapidly growing traffic and fundamental changes in traffic flows. For instance, a drastic decline in coal imports from Poland and Great Britain inflated demand for coal from the Donbass, which the railways now had to ship throughout the country. Grain, which had previously been exported through north-western and southern ports, was redirected westwards to feed the army. Particularly troublesome was the need to reroute most imports and exports through Vladivostok and Archangel because of the enemy blockade: the Pacific port depended on the barely complete and slow trans-Siberian route, whilst Archangel could be reached only by a low-capacity single-track narrow-gauge (1,067 mm) railway from Vologda, the conversion of which to Russian standard gauge (1,524 mm) was not completed until 1916. A line to Murmansk from the Petersburg region was under construction in 1914 and provisionally opened in 1916.

The railways' actual performance in 1914–16 was respectable yet worrying. As in other belligerent countries traffic initially declined through the cancellation of commercial shipments to facilitate mobilisation. But shipments reached record levels in 1915 and again, after their habitual winter decline, in the summer of 1916.⁴⁵ However,

congestion and long delays were common on principal routes by 1915, causing shortages of food and fuel and a contrasting abundance of complaints and recriminations. Thus, for example, Archangel and Vladivostok were soon choked with goods awaiting shipment inland.⁴⁶ Moreover, these problems were perhaps fatally compounded by the army's sudden retreat from Poland in the summer of 1915. The commandeering of rolling-stock for the evacuation caused severe shortages of wagons in the rear, disrupting vital shipments of coal, raw materials and food. Also, by late 1916 the strain was beginning to tell on the railways' equipment. When labour disruption spread in the winter of 1916–17, the usual winter traffic dip became a precipitous collapse during 1917.

Historians have disputed whether the railways failed the country, as was widely believed at the time, or the country failed the railways. Unsurprisingly, scholars who have characterised the pre-war system as underdeveloped and ill-equipped have emphasised the railways' inadequacies. But others with a more sanguine view of the pre-war situation have defended the system's wartime record with the possible exception of organisation.⁴⁷ Whichever argument is correct, the tsarist government itself did perceive a significant expansion of railway capacity as a military and economic necessity for both the war effort and the postwar period. Moreover, it took important steps to this end, including its decision to allow railway imports.

Some decisions simply addressed the short-term emergency. Wagons of 1,000-pood capacity (16.3 tonnes) were permitted to carry 1,200 poods (19.56 tonnes); the maintenance of locomotives, rolling-stock, track and structures was reduced to enable their use for longer periods; and spare parts, tools, metals and other supplies were approved for purchase abroad.⁴⁸ However, other measures also had potential long-term benefits. Interestingly, these included some degree of modernisation with at least one eye on the postwar future. As in the final pre-war years, existing infrastructure was upgraded, particularly by adding second tracks, laying heavier rails and increasing the size and length of marshalling yards; and railway workshop capacity was gradually expanded. Also, orders for new engines and rolling-stock were increased, including imports, though not yet to the full extent of the 2,000 additional engines and 70,000 freight wagons requested by the railways and the Special Council for Defence.⁴⁹ Great efforts were made to complete lines already under construction in 1914, partly using imported rails, and nearly 10,000 km of new routes were opened.⁵⁰ Indeed in an interview in November 1915, the

minister, A. F. Trepov declared that Russia needed a new network of railways and that railway construction would be continued. A commission chaired by deputy minister I. N. Borisov produced a far-reaching ten-year construction plan, and in mid-1916 the MPS requested the State Duma's approval for the first phase, a massive five-year programme costing at some 600 million rubles per year.⁵¹

Imports were by no means an easy option because the war was devastating Russia's foreign trade.⁵² The country immediately lost her most important trade partner, Germany. Worse, by December 1914 the German–Turkish blockade of the Baltic and Black Seas was forcing reliance on the secondary ports of Murmansk and Archangel in the north, and Vladivostok and Nikolaevsk in the Far East, which were all poorly served by the domestic transport network. Exports and export earnings collapsed. Extensive efforts were made to import armaments, railway equipment and other supplies, but the cost was high. The Treasury's ability to pay for orders was impeded by the loss of export earnings, wartime restrictions on the international movement of currency holdings, and chronic difficulties in obtaining new foreign credit. Also, deliveries were often badly delayed through production problems, sabotage and a shortage of sea-going tonnage. A trade surplus of 146 million gold rubles in 1913 had become a deficit of 1,873 million in 1916, and the foreign debt jumped to 13,800 million gold rubles over the same period, yet overall Russia had relatively little to show for her expenditure.⁵³

Russian ministries began sending purchasing agents abroad from August 1914, concentrating on Britain, France, Japan and especially North America. Later, from 1915, Russian government supply committees were formed as coordinating agencies in these and other countries, with overall coordination delegated to the Russian Government Committee in London. Naturally, military contracts predominated, the main priorities being field guns, howitzers, shells, hand grenades, rifles, cartridges and boots. But MPS purchases, mostly of railway supplies, were also very significant. Of the Russian state orders worth at least US\$1,176 million placed in North America between mid-1915 and the Bolshevik Revolution, contracts for the Main Artillery Directorate accounted for some \$767 million, whilst MPS contracts formed the second largest share at just over \$167 million or some 14 per cent of the total.⁵⁴

The key examples of locomotive and wagon policy suggest that the idea of importing railway supplies arose, as with purely military purchases, very early in the war, that the MPS took the initiative, and

that one reason for this was lobbying by American industrialists. By late August 1914 there was talk of a possible MPS emergency order in America for 250 locomotives and 10,000 wagons. Also, continuing the discussion of traction modernisation, the MPS was considering ordering prototypes of new 2–10–2 freight and 4–6–2 passenger types from the United States as successors to the classes E and S.⁵⁵ Neither of these ideas progressed much further at this stage, but the idea of imports did become established, thanks partly to Samuel Vauclain, a vice-president of the Baldwin Locomotive Works of Philadelphia, USA:

When war was declared between Germany, England, France and Russia we were running at about one third capacity and I concluded we might obtain some foreign business if someone who knew how to handle it could get into Russia. We had a representative in Russia in whom we had little confidence. His wild cablegrams indicated little knowledge of our business, so I decided to go to Russia ... We found the Baldwin representative trying to carry on business in his room on the fourth story of a house remote from the city's centre. After contacting with the Vice-Minister of Communication concerning locomotives and assisting his engineers in the construction of equipment for war purposes, we concentrated upon narrow-gauge locomotives for the railroad running north to Archangel. For the Russian artillery department, an order for 100,000 military rifles was cabled to the Remington Arms Company.⁵⁶

By stressing rapid delivery Vauclain won a contract for thirty so-called 'Mallet' locomotives for the vital Archangel line, and within a few months he was back in Russia seeking new contracts, such were his optimism and determination.⁵⁷

But domestic issues were also important in the policy change. One problem was tension over the Committee for Railway Orders, whose latest three-year reprieve was to expire on 1 January 1915. The cartels, facing shortages and greater regulation of production, pressed hard for a five-year extension, lobbying ministers and the chairman of the Council of Ministers. But the MPS now withdrew its support. The minister, S. V. Rukhlov, wanted to undermine the syndicates' power and argued that subsidies were unnecessary since contracts worth over 40 million rubles were being planned. Opposed only by the syndicates and the Ministry of Trade and Industry, the abolition of the committee was approved in late October 1914.⁵⁸

Other problems concerned factory capacity and contract terms. The engineering industry made increased railway-related output condi-

tional upon receiving large long-term contracts on similar terms to military contracts. The demands included higher prices, large deposits, firm guarantees for supplies of materials and fuel, exemption from military conscription for their workers, and the right to miss delivery deadlines because of wartime difficulties.⁵⁹ Locomotive orders were also delayed because some factories wished to concentrate on the Class S and out-dated Class Shch so as to avoid any retooling, whereas the MPS wanted maximum deliveries of the Class E so as to increase line capacity by operating heavier trains. However, armaments work apart, probably the main cause of delay with locomotive contracts was failure to agree prices, the government resisting the pressure to match those offered by the military.⁶⁰ As for wagons, the MPS specified its requirement for 1915 as 60,000 compared to maximum factory capacity of about 43,000, and so it concluded that some 17,000 would need to be imported.⁶¹ Track materials were more troublesome. There had already been difficulties with supplies in 1913 caused by shortages of cast iron, and the war exacerbated the problem, especially when some of the rails factories switched to making armaments.⁶²

The engineering factories persisted with their demands through the winter. In January 1915 the wagon-builders' cartel, *Prodvagon*, was still seeking three-year contracts and large advances to support expansion of its annual capacity to 60,000 so as to cover virtually all the demand.⁶³ However, Russian industry as a whole adopted a more conciliatory position over wagons. In December 1914 the Council of the Congress of Representatives of Trade and Industry urged the Council of Ministers to approve subsidies and priority for supplies of materials and parts, and also demanded contracts for 49,000 wagons – its estimate of Russian capacity – for delivery in 1915. But the delegates agreed that any shortfall should be covered by imports because the wagon shortage was already causing an industrial 'crisis'.⁶⁴

In the end all sides were probably reasonably satisfied. The railways received far fewer resources than desired, but they did at least win access to foreign suppliers, whom the private railways at least had long regarded as more efficient, technologically advanced and responsive to customer concerns. The autumn of 1914 saw *Vauclain's* 'Mallet' contract plus orders for 4,890 tonnes of rails and more than 2,000 sets of points from the United States.⁶⁵ Meanwhile, the Shchukin commission swiftly approved a new 2–10–0 heavy freight design for urgent mass production abroad.⁶⁶ A special interministerial meeting

then allocated 53 million rubles for essential MPS imports in January 1915. Several months later the Council of Ministers authorised orders in North America for 400 locomotives of the newly approved type plus 17,700 American-type high-capacity four-axle wagons (equivalent to 40,000 standard Russian twin-axle 16.3-tonne wagons). Approval to import a further 35,000 standard wagons followed in June.⁶⁷

As for the engineering industry, by mid-February 1915 Prodvagon had firm orders for delivery that year of 36,115 wagons, and conditional orders for another 7,289. In addition, the MPS agreed to higher prices for wagons and to the principle of three-year contracts, probably in exchange for a commitment to boost wagon output to 63,000.⁶⁸ Meanwhile the locomotive-builders complained to the Shchukin commission that the urgent foreign order for 400 freight engines would force Russian factories to reduce their 1916 production targets. They forecast considerable surplus capacity because the MPS was actually planning to order only 620 engines in Russia in 1916, whilst the private railways were likely to order only about 150. But, significantly, they acquiesced to the imports provided that the foreign locomotives began entering service within six months of the contract.⁶⁹ The syndicate's protocols are silent on the point, but one may speculate that with the government refusing to raise prices for rolling-stock, the factories were hoping to get more lucrative military contracts instead. The engineering industry had already begun suspending private and state railway contracts in late 1914, probably partly for this reason, and this trend was encouraged in 1915 by the shell shortage and the general war mobilisation of industry.⁷⁰

Why, then, did the government permit these imports instead of giving railway production the same priority and pricing as armaments? Increased domestic output was certainly wanted, but a key problem was the severity of the shortages of basic armaments such as shells, rifles and cartridges, and of machine-tooling and raw materials, especially metals. Wagon parts, for instance, needed steel akin to that used for shells, whilst the same machinery could make gun barrels, and though the wagon shortage was among the most critical bottle-necks, the armaments crisis was even more important.⁷¹ Thus, a combination of urgency and shortages was probably enough to justify wagon imports as a stopgap, though the MPS was obviously keen for a modern American design into the bargain. As for locomotives, the selection of a new modern type which could not be built in Russia without retooling – itself problematic – suggests that the government accepted the logic of trying to increase line

capacity quickly by introducing bigger engines to pull significantly heavier trains.

In the event, the engineering industry's relationship with the MPS and railways remained fraught throughout the war. Underproduction continued despite objections from the MPS and the Special Council for Shipments, which planned railway traffic. The severe shortages of raw materials persisted, and other problems included the evacuation of key companies from the Baltic provinces such as the Russo-Baltic Wagon Works and the Phoenix Works in 1915. It is thus scarcely surprising that, for example, Prodvagon built some 7,500 wagons fewer than planned in 1915, whilst production of much-needed rails slumped from 650,370 tonnes in 1914 to 265,690 tonnes in 1916.⁷² Locomotive output reached 870 in 1915, but dropped to 576 in 1916, the delivery shortfall of 474 in 1916 being deferred to 1917.⁷³

The placement of foreign railway orders began in earnest in the spring of 1915. A contract for 20,000 wagon axles in April was followed by agreements for 13,160 wagons, 28,700 wheelsets and 25,000 steel tyres. The 400 2–10–0 freight engines were ordered in July 1915: 50 from the Canadian Locomotive Company of Kingston, Ontario; 100 from the Schenectady works of the American Locomotive Company (Alco); and 250 from the Baldwin Locomotive Works. In July and August orders were placed for 204,900 tonnes of rails and 41,700 tonnes of associated fittings such as rail joiners and bolts. By the end of the year 56 shunting and medium-powered freight locomotives had been ordered for the Murmansk Railway from the H. K. Porter Company.⁷⁴ As for technical supervision, a so-called Commission of Ways of Communication in America was established under the chairmanship of a senior MPS technical inspector, Count S. I. Shulenburg. This organisation worked in close cooperation with the Russian Supply Committee in America, and was eventually incorporated into the latter in 1916.⁷⁵

The 2–10–0 locomotives, which were the product of the Shchukin commission's modernisation deliberations, were officially designated as the Class Ye but were known familiarly throughout Russia as the 'decapod' (*dekapod*). They represented a certain technological advance over the 0–10–0 through their extra axle, modern bar-type frame and various other features. Moreover, though larger and heavier than the 0–10–0, their maximum axle-loading was no greater, at 16.2 tonnes. Unfortunately, this weight was heavy by Russian if not American standards, and like the 0–10–0 the decapods had to be concentrated on routes relaid with heavy rails, mainly in Siberia and the Donbass.⁷⁶

After assembly in America each locomotive was dismantled and packed in some thirty-four crates. As with the bulk of the railway purchases, most were then shipped to Vladivostok, where they began arriving in late 1915. Next they were forwarded to the Chinese Eastern Railway workshops in Harbin, Manchuria, where representatives of the builders provided technical assistance in the reassembly process. The first locomotives eventually joined the operating stock after trials in early 1916 – a delay which reflects the general difficulties faced by the supply committees during the war: shortages of tooling, materials and shipping, the closure of the Panama Canal in 1915–16 and, ironically, delays in transporting imports inland from Vladivostok.⁷⁷

The first decapods had a frosty reception on the railways themselves. Many staff were suspicious of the unfamiliar design features and unhappy with the large American castings, for the maintenance of which many depots were not yet equipped. There were many complaints about substandard riveting, and the boiler tubes were apparently prone to develop leaks. Also, there were many derailments of the much-heralded leading axle. Most dramatically of all, the boiler of one unfortunate Baldwin decapod exploded in May 1917. Complex design and poor assembly were blamed – an analysis strongly disputed by Baldwin but which at least made a change from the usual alleged cause of such eruptions, drunkenness.⁷⁸

In other respects, however, the locomotives' performance was encouraging. For instance, they could easily haul long trains weighing over 3,260 tonnes, which represented great potential as goods yards were expanded to accommodate such trains.⁷⁹ In time, the decapods generally became well regarded. The tsarist MPS did not hesitate to request many more, albeit with improvements, when possible new imports were discussed in 1916, whilst in 1923 Siberian engineers described the decapod as the best class in their service, and in 1925 many of its features were recommended for new Soviet designs.⁸⁰

The commissioning of the foreign-built wagons also involved controversy. As with the decapods, their full potential could not always be used. The larger wagons had to be restricted to routes relaid with heavy rails, and most sidings were still too short to hold the very long trains for which these wagons, with their modern automatic brakes and couplings, were ideally suited. There were also other problems, some quite peculiar. For example, the Russians insisted on shipping coal in covered rather than open wagons, and because the American vans had two rather than four doors, the loading and unloading of coal was more difficult. But the most serious

complaint, especially from 1917 onwards, concerned their Westinghouse automatic brakes, and threatened to discredit the ministry's dream of equipping the network's entire stock with modern brakes: numerous wagons were disabled because, as enterprising or desperate railwaymen quickly discovered, their rubber brake pipes were ideal for making boot soles.⁸¹

In general, however, the most intractable difficulties with railway imports were not human or technical but financial. In July 1916 Rukhlov's successor at the MPS, Trepov, informed the Tsar that the ministry had still to order some 5,000 of the 17,700 high-capacity wagons authorised in the spring of 1915 and all of the 35,000 standard wagons sanctioned in June 1915. The delay was blamed entirely on a shortage of hard currency.⁸²

Initially, the Russian government's primary source of wartime foreign credit was Great Britain, first through agreements with the bank of Baring Brothers and then with the British government.⁸³ The first credit was for £12 million, granted by Barings in October 1914, and was approved by the British government on condition that Russia supplied gold and bullion worth £8 million to maintain the value of sterling. A credit of £20 million followed in January 1915, and a further £20 million was raised in Britain in April 1915, half of it from a public issue of Treasury bills.

By this time moves were afoot to organise a more substantial supply of aid. A special conference about inter-Allied financial assistance produced an agreement which, among other things, defined Russia's credit requirement as £100 million. France and Britain each supplied £50 million, the British contribution being paid by Barings in two instalments of £25 million in June and July 1915. However, this money lasted only a few months, and a fundamentally new approach was required to cover Russia's needs. A further inter-Allied conference was thus convened in September 1915, producing a financial framework which, by and large, endured until the February Revolution. It was agreed that from October 1915 Britain would provide a monthly credit of £25 million for one year by discounting Russian government Treasury bills. The Russian government was to ship £40 million in gold to London as security. Britain would fund Russia's foreign military contracts except those in France and – to the Russians' resentment – would supervise the placement of new orders.⁸⁴

In June 1916 another conference was held in London to discuss future needs. However, agreement was not reached until October. The